

C E N T R A L I N T E L L I G E N C E A G E N C Y
O F F I C E O F C E N T R A L R E F E R E N C E

M A C H I N E U S E

T A S K T E A M R E P O R T N O . 2

TTR/2

21 February 1958

MEMORANDUM FOR: Assistant Director, Central Reference

S U B J E C T : Final Report on Machine Use, Task Team No. 2

1. Membership

25X1A

[REDACTED] Special Register, OCR
[REDACTED] Special Register, OCR
[REDACTED] Machine Division, OCR

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2. Method of Task Team Operation

This task team consisted of three individuals having varied degrees of experience in machine data handling system operations. Using the tools that were given to us, we studied the Library Consultants' Report, the "topic" cards, and the rebuttals that had been prepared by the Machine Division.

In order to understand and appreciate some of the proposals made by the Consultants, we visited the U. S. Department of Agriculture Library. Dr. Shaw's Photoclerk machine was demonstrated and explained to us. We visited their photo lab and were shown how the photo copies of bibliographic data are processed.

The task team accompanied a larger group for a comprehensive tour and briefing of the entire Machine Division operations. We had several follow-up meetings to discuss our problem with the Chief, Machine Division, the Assistant Chief, and the branch and section chiefs directly concerned with those functions related to our problem. On two occasions, together with Machine Division personnel, we made close examination of the punched card intellofax files. We queried in detail each step in the maintenance and servicing procedures for these files. We analyzed a representative sample of the requests for intellofax runs. The quality of work, production speed, and operating costs of the electronic type facsimile printers, the new photographic process (about to be inaugurated by the Machine Division), and other systems were discussed with the Machine Division. They provided us with figures for comparing these data.

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TTR/2-2

The task team visited [REDACTED] of the Printing Services Division, OL, to discuss, and have demonstrated, various reproduction processes and equipment. We were interested primarily in the Xerographic reproduction process.

To provide a means of appraising the suggestion that the quality and utility of photostat reproductions were below standard, the task team talked with Machine Division and Library personnel. We discussed the background and reasons for choosing the photostat equipment, the basis for reduction requirements, and the feasibility of alternative processes. Experiments were made in processing photostat prints from aperture cards, reel film, and hard copy. An appreciable amount of research was undertaken, using the facilities of the CIA Library and the Library of Congress, to determine what standards have been established for size of print, definition, and degree of contrast in reproduction work of this type. Several examples of originals and their reproductions were taken to the Reading Improvement Branch, OTR. Their staff evaluated these items in terms of readability. We discussed this portion of our problem with them.

We have been able to make our most specific conclusions and recommendations in relation to those portions of our problem that relate to the punched card files and operation. The other part of our problem, relating to the cost and quality of the reproduction effort, deals with more generally controversial subjects.

3. Recommendations

- a. Three machine operators should be assigned the primary responsibility of maintaining the intellofax files. These operators should be assigned to a second (night) shift. (p. TTR/2-4)
- b. Each file tray should be clearly labeled as soon as it is put into use. (p. TTR/2-5)
- c. The two major file groups (Subject and Area) should be arranged so that space is provided for additions to each major group within its assigned area. (p. TTR/2-5)
- d. The file merging and sequence checking operations should be performed with machine control panel wiring that provides the most effective operating speed. (p. TTR/2-5)
- e. A separate secured area should be provided to house classified trash and boxes of classified IBM cards that accumulate throughout the work day. (p. TTR/2-7)
- f. The Subject file should continue to be sorted and maintained in its present arrangement. (p. TTR/2-9)

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TTR/2-3

g. All parts of the existing Area file should be combined in arrangement by area code only. (p. TTR/2-9)

h. A more specific location file, that records city names or natural features, etc., should be developed for the future. (p. TTR/2-9)

i. In most cases, the experienced machine operator handling the request should continue to decide whether mechanical or manual selection should be performed. (p. TTR/2-9)

j. The Card List Cameras should be given a fair opportunity to prove their advantages over the electronic facsimile printers. (p. TTR/2-11)

k. The Photostat Expeditors should continue to be used to perform their several functions in the reference operations. (p. TTR/2-11)

l. The Photostat Corporation should be commissioned to modify the Expeaitors used in OCR to increase their reproduction ratio. (p. TTR/2-12)

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Task Team Two

Attachment:

Final Report of Task Team Two

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TTR/2-4

TOPIC #1

"Machine filing and selection is limited by virtue of the multiplicity of IBM file decks."

CONCLUSIONS

We agree that the efficiency of this operation has probably been impaired due to an excess number of supplemental files. However, this extreme condition is not intrinsic to the system. It is suggested that five would be the optimum number of parts for the intellofax Subject file (4 million cards). The intellofax Area file (1 million cards) would be in its optimum state contained in three parts.

The Subject file may at times be reduced to less than five parts and the Area file to less than three parts, but this condition should exist for only a relatively short period. If the number of file parts were held to these lower figures for any extended period, it should indicate that more effort is being spent on merging files than is economically justifiable.

FINDINGS

On 11 January there were eight Subject files (total of 4 million cards). There were fourteen Area files (total of 1 million cards). The multiple segments of these two major file groups were intermixed. The trays were not all clearly labeled. On 23 January there were six Subject files and fourteen Area files. The two major file groups were distinctly separated.

Our discussion with the Machine Division personnel led us to understand that the status of the Subject file on these two days was fairly representative. However, the Area file had purposely been maintained in several parts due to revised filing systems. Their plans call for combining these fourteen Area files into three or four files in the near future.

The intellofax file requires a "hard core" of files maintenance personnel whose efforts should not be diverted from their primary responsibility. Frequently the file maintenance work is interrupted so that all hands can be utilized in servicing requests. Consequently, the number of file parts becomes excessive and all requests (including crash requests) suffer in the long run.

RECOMMENDATIONS

1. Three machine operators should be assigned the primary responsibility of maintaining the intellofax files. This operation includes the

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Approved For Release 2000/09/01 : CIA-RDP81S00991R000200150003-3

TTR/2-5

processing of each day's additions to the index and merging those cards and the "returns" with the basic files. The three operators could most efficiently perform these duties if assigned to a second (night) shift. One of the three should be a higher grade supervisor. (At times the Machine Division has utilized a few operators of equal grade on temporary night shifts and designated one as being responsible for the group.)

2. Each file tray should be clearly labeled as soon as it is put into use. The file name, part number, and tray number should suffice. Frequently, many trays at a time are removed from the file cabinets. It is conceivable that these trays, if unlabeled, may not always be returned to their proper locations.

3. The two major file groups (Subject and Area) should not be intermixed. They should be arranged so that space is provided for additions to each major group within its assigned area.

4. The machine file-merging operation should utilize control panel wiring that provides simultaneous feeding of cards from both files when there are cards with identical file codes in the two groups. The merging speed will be increased by 100% when this equal condition exists, and it does exist frequently. A solution to the established routine (merging followed by sequence checking) can be worked out. Also, the sequence checking operation can be performed at double the present machine speed by utilizing two machine feeds at one time. This is awkward for some machine operators, but the type of specialists assigned to this task should be able to provide this type of service. The larger the file concerned, the more practical it becomes to make use of this technique.

TOPIC #2

"The machine files require excessive space."

CONCLUSIONS

We have determined that the machine punched card files, for the existing intellofax system, do not require excessive space. Actually, for proper support of this system, we believe that more file space is desirable, or at least there should be less encroachment on their allotted space.

The existing machine punched card files do not require as much space as would be needed to house an equal number of 3x5 cards with conventional library accommodations for browsing.

FINDINGS

The punched cards for the intellofax system are housed in modern steel file cabinets. The average file tray is filled to capacity

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Approved For Release 2000/09/01 : CIA-RDP81S00991R000200150003-3

TTR/2-6

(upwards of 3,000 cards). There are not an unreasonable number of empty or partially filled trays available for the daily additions.

Space requirements for this type of file are compared with the requirements for a conventional 3x5 card file in the following table:

TABLE OF COMPARATIVE SPACE REQUIREMENTS

	"CLOSED" *	"OPEN" **
	PUNCHED CARD FILES	3x5 CARD FILES
Cards per tray	3,000	2,000
Trays per cabinet	28	24
Cards per cabinet	84,000	48,000
Cabinet size	19" x 28"	11 1/16" x 24"
Floor space per cabinet	3.7 sq ft	1.8 sq ft
Cabinets for 5,000,000 cards	60	104
Floor space for 5,000,000 cards	222 sq ft	187 sq ft
Cabinets in double rows	30	52
Length of aisle	48 ft	48 ft
Width of aisle	4 ft	7 ft ***
Floor space of aisle	192 sq ft	336 sq ft
Total floor space	414 sq ft	523 sq ft

* "CLOSED" is used here, and interpreted in the Consultants' Report, as meaning a file that is accessible only to assigned personnel, for servicing the requirements of others.

** "OPEN" is used here as meaning a file through which all individuals may browse and, if desirable, serve themselves.

*** Mr. New, Chief of the Files Section, Catalog Maintenance Division, Library of Congress, in a telephone conversation of 15 January 1958 stated that the width of the aisle in their Official Catalog was 7'4". He felt it should be wider.

The above table indicates that the "open" 3x5 card file requires 26% (109 sq ft) more floor space than the existing type of "closed" file.

Numerous sacks of classified trash are brought in and placed in front of the cabinets in the intellofax file room throughout the day. Classified IBM cards being boxed for storage or that have been called back from storage for service are frequently stacked in front of the file cabinets. These bags and boxes must be moved to gain access to the filed cards when servicing requests.

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Approved For Release 2000/09/01 : CIA-RDP81S00991R000200150003-3

TTR/2-7

RECOMMENDATIONS

1. Even though we have made a comparison of the file space requirements for two systems, it is not part of our project to consider the other elements involved. Therefore, we have no recommendation for either system.
2. A separate secured area should be provided to house classified trash and boxes of classified IBM cards that accumulate throughout the work day.

TOPIC #3

"Machine sorting and refinement is minimal."

CONCLUSIONS

The Subject file is sorted and maintained with a satisfactory degree of refinement.

No amount of sorting for maintenance of the existing Area file will provide as satisfactory an area index as is desirable. A considerable amount of experimenting with different sorting arrangements has been carried on throughout the years that this file has been in existence. The present plan, which calls for combining all parts of this file in an arrangement by area code without regard to subject or source codes, appears to be the most satisfactory.

All refinement in the selection process can be performed mechanically. Some of this refinement is performed manually and there is justification for a limited amount of that. It is not practical to apply a rigid standard for applying mechanical vs. manual refinement in the selection of these punched cards. This can best be determined by the experienced machine operator on the basis of the specifications given with each individual request. However, we are convinced that more consistent accuracy can be obtained through machine refinement than can be obtained through manual refinement.

FINDINGS

The intellofax Subject file is machine sorted for maintenance in sequence by the complete six digit subject code, with a subordinate arrangement by the five character (alphabetic and numeric) area code. Most of the intellofax requests specify refinement on the basis of the complete subject and area coding. Requirements for refinement beyond that point are extremely variable and can most efficiently be made through machine selection.

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Approved For Release 2000/09/01 : CIA-RDP81S00991R000200150003-3

TTR/2-8

Maintenance of the Area file has not been confined to one type of arrangement. Part of this file is arranged by the complete source (locator) code, within area. Part is arranged only by the source agency code, within area. Part is arranged by six digits of the subject code, within area. Part is arranged by three digits of the subject code, within area. The Machine Division plans to combine all of these parts with a common arrangement by area code only, disregarding any subordinate refinement for maintenance.

Representatives from the Machine Division, Library, and Document Division agree that the existing Area file is less than satisfactory. For example, Western Europe and East Germany are not included in this file. Only the USSR and China have regional (oblast, republic, and province) control. Country alone is usually too general a basis on which to service requests. The subject coding that is applied to this file reflects only a few selected general subjects.

In November 1957 only four out of two hundred requests were serviced from this file. As considered typical of the type of service it renders, one of those four requests resulted in 1,194 intellofax cards being selected through the machine process; these cards were then scanned by the Library and only 44 of them were called to the attention of the requester. On 30 January 1958 the only request in process that required using the Area file, provided 6,000 intellofax cards. The Library was notified that 6,000 cards had been selected and their response was to cancel the request.

All refinement in the selection process is performed as it is spelled out, in terms of the punched codes, on the written requests that originate in the Library. (The Machine Division personnel receive no explanation of what the requesters' interests are.) The experienced machine operator exercises his own judgment in determining how much of the refinement is to be performed manually and how much by machine. He bases this decision on the number of cards involved, the dispersion of the specified codes throughout the file, and the availability of machines. For example, sometimes a crash request may be selected and refined more quickly by hand although there would be greater assurance of accuracy if it were held up until a machine could be utilized.

The intellofax system utilizes less than half of the IBM card for recording data in the form of punched holes. Therefore, only thirty one of the provided eighty card columns are used for machine sorting and refinement. Only a great deal of experience with the requirements levied against a given punched card indexing system can provide a means of arriving at the optimum distribution between the sorting effort for maintenance and the selection effort for retrieval.

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TTR/2-9

RECOMMENDATIONS

1. The Subject file should continue to be sorted and maintained in its present arrangement.
2. All parts of the existing Area file should be combined in arrangement by area code only.
3. A more specific location file, that records city names or natural features, etc., should be developed for the future. This is being planned for the Minicard system and it can be handled with the present IBM system. The subject code field (six columns) and part or all of the locator code field (six columns) are of little or no use in the Area file. These twelve card columns could be used to record the more specific location. If necessary, punching could extend into the printed text portion of the card without obliterating any critical information. We believe that a more specific location file would be more frequently called upon than the present Area file. It should eliminate the need for some of the present Subject file searches, such as those that involve ninety or more subject codes.
4. Machine, rather than manual, selection should always be made for the subordinate refinement whenever the requested subject code category is more general than its finest decimal breakdown. In all other cases the experienced machine operator handling the request should continue to decide whether mechanical or manual selection should be performed.

TOPIC #4

"Facsimile and photostat expeditor service can be obtained at lower cost by use of other processes."

CONCLUSIONS

The electronic facsimile printers have become outmoded. The service they provide can be obtained at lower operating costs through a photographic process.

The Photostat Expeditors provide reproductions without the awkwardness of a separate processing operation. They are readily converted for use with hard copy or aperture cards. The services they provide can not be obtained at a lower cost by any other process.

FINDINGS

Two years ago the Machine Division began work on developing a photographic process to replace their electronic facsimile printing operation.

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Approved For Release 2000/09/01 : CIA-RDP81S00991R000200150003-3

TTR/2-10

They were interested in a short-term replacement because it had been determined that the Minicard system would replace the entire intellofax system in a period of about seven years. The Library Consultants were advised of this and were informed of the progress that had been made in this direction. Therefore, it is assumed that their recommendation for silver paper reproduction was in support of the photographic process that the Machine Division was about to initiate.

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Two of the electrically motivated and controlled cameras (Card List Cameras) have been built for the Machine Division at a cost of less than [REDACTED] The Machine Division has performed tests and produced sample tapes of bibliographic data. These sample tapes are far more legible than those produced on the electronic facsimile printers. As soon as a supply of photographic paper is on hand, the Card List Camera process is expected to replace the electronic facsimile process.

The Card List Cameras are supported by a Photostat Expeditor, which is used to process the exposed photographic paper. It is estimated that the system, cameras and processor, will produce tapes at twice the speed of the old system. This will require one half the number of operator man hours. Less high grade technical man hours for maintenance will be required. The clerical time spent scanning the tapes for legibility will be practically eliminated. The cameras can be utilized in one-fifth the amount of space required for housing the electronic printers. Electric power consumption will be .4 kilowatts per hour as compared to the present 10.8 kilowatts per hour. The air conditioning requirement will be about one-eighth of that needed with the electronic equipment.

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At the time it was acknowledged that an interim remedy for the intellofax printing service was needed, the Machine Division considered the RCA Electrofax type of process. At that time (two years ago) neither RCA Electrofax nor Haloid Xerox equipment could be obtained for a price comparable to the [REDACTED] cost of the Card List Cameras. Equipment modifications would have been required for either of these types to accommodate the intellofax cards. The recently acquired Xerox Copy Flow machines, in use at the Agency's reproduction plant, rent for [REDACTED] each per month. They can be purchased for [REDACTED] each.

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The Photoclerk machine is used at the U. S. Department of Agriculture Library for copying bibliographies in the preparation of book purchase orders, budgetary data, and overdue notices. It is occasionally used to copy catalog cards to provide a bibliography on request. We were advised by a spokesman there that it usually took two days, from the time they started each new roll of silver paper through the Photoclerk machine, until the prints were available from their photo lab.

The Photostat Expeditors have been modified to provide reproductions from 16 mm. film in IBM aperture cards as well as reproductions from reel

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TTR/2-11

film and hard copy. They provide a complete type of service so far as these needs are concerned. No additional photo lab equipment and operation is involved.

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The Xerox Copy Flow equipment appears to provide the most legible material at the fastest speed. However, separate machines [REDACTED] are required to handle hard copy and film. It is a continuous movement process in which the items being copied must pass the lens in synchronization with the paper that contacts the charged drum. Therefore, this equipment could not be modified to accommodate the aperture cards.

RECOMMENDATIONS

1. The Card List Cameras should be given a fair opportunity to prove their advantages over the electronic facsimile printers.
2. The Photostat Expeditors should continue to be used to perform their several functions in the reference operations if cost is an important factor.

TOPIC #5

"The reproduction ratio in use on the photostat expeditor should be increased."

CONCLUSIONS

The present reproduction ratio used on the Photostat Expeditor fails to provide the size of print that is generally acceptable for continuous reading, when copies of legal size documents are reproduced from aperture cards. Reproductions from hard copy, and those made from aperture card images of letter size documents, are acceptable.

FINDINGS

Our limited research showed that there remains a large area of disagreement on this topic. An acceptable size print is dependent upon numerous conditions. Donald L. Cleland, Director of the Reading Laboratory, University of Pittsburgh wrote in the American Journal of Optometry, September 1953:

"If you are trying to determine what is the optimal size of type, let us consider the variables which enter the picture. What size type is optimal under this illumination? What about the type boldness? Does the length of line influence the findings? What about the amount of leading? Is the material for rapid reading, for skimming, or for detailed reading? What about the surface or the tint of the paper?"

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However, the consensus of opinion seems to indicate that the print on some OCR reproductions is smaller than the generally acceptable size. The figure most frequently used as a minimum acceptable size is six point type.

The Reading Improvement Branch, OTR determined the print size of a sample reproduced 8" x 10" document to be six points. However, the print size of a sample reproduced legal size document was measured to be four points. Since a majority of the documents received in OCR are on legal size paper, the problem becomes more significant.

On the basis of their professional experience and personal preference, the Reading Improvement Branch spokesmen concluded that the size of print should be increased, especially for the legal size documents.

Preliminary discussions between OCR and representatives of the Photostat Corporation have indicated that the Expeditors can be modified to provide more acceptable reproductions from aperture cards. The modifications can be made at a relatively small cost. The Photostat Corporation would expect to gain through the sale of more paper. From 60 to 100% more paper would be used in making larger reproductions that would satisfactorily serve the consumers. OCR is now spending roughly [redacted] per year for photostat paper. The Photostat Expeditors accommodate a rather complex system in OCR that involves reproducing from 16 mm. film aperture cards, 16 mm. and 35 mm. reel film, and several sizes of hard copy material.

RECOMMENDATION

The Photostat Corporation should be commissioned to modify the Expeditors used in OCR to increase their reproduction ratio so that acceptable standards can be met.

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